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Are You Satisfied?

Citizen Feedback and Delivery of Urban Services

Uwe Deichmann
Somik V. Lall

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Abstract

Citizen feedback is considered an effective means for improving the performance of public utilities. But how well does such information reflect the actual quality of service delivery? Do so-called scorecards or report cards measure public service delivery accurately, or do personal and community characteristics have a significant impact on residents' assessment of service quality?

Deichmann and Lall investigate these questions using newly available household survey data on access to and satisfaction with selected public services in two Indian cities—Bangalore and Jaipur. They develop a framework where actual levels of services received, as well as expectations about service performance, influence a household's satisfaction with service delivery. The authors find that satisfaction increases with improvements in the household's own service status, a finding that supports the use of scorecard initiatives. But the results also suggest that a household's satisfaction is influenced by how service quality compares with that of its neighbors or peers and by household level characteristics such as welfare and tenure status. This implies that responses in satisfaction surveys are at least in part determined by factors that are unrelated to the service performance experienced by the household.

This paper—a product of Infrastructure and Environment, Development Research Group—is part of a larger effort in the group to improve urban management through the collection, use, and public disclosure of spatially detailed information and analytic methods. The study was jointly funded by the World Bank and the U.K. DFID's Urban Knowledge Generation and Toolkits Program. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Yasmin D'Souza, room MC2-622, telephone 202-473-1449, fax 202-522-3230, email address ydsouza@worldbank.org. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The authors may be contacted at udeichmann@worldbank.org or slall1@worldbank.org. June 2003. (31 pages)

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Uwe Deichmann and Somik V. Lall

Development Research Group, World Bank, Washington DC, USA

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Are you satisfied?
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1. Introduction

Citizen feedback is often seen as an effective means for evaluating the quality of urban public service delivery. The rationale behind this approach is that collective or organized feedback can be used to demand accountability from providers of public services, especially when there are no alternate providers due to regulation and natural monopolies in the delivery of these services. One of the most widely cited examples of organized citizen feedback is the 'report card' or 'scorecard' where users are asked to rate their satisfaction with various aspects of service provision (Paul 1998). Examples include evaluation of service delivery in India, the Philippines, Ukraine, Malaysia, and the United States (Shah and Wagle 2001, World Bank 2001, UMP 2000). Report cards that solicit feedback can provide citizens an opportunity to shape the decisions that affect their lives. Stern (2002), among others, therefore suggests that such initiatives are a promising instrument for empowerment

Since the objective of scorecards is to create public awareness as well as enhance responsiveness of service providers, it is useful to examine the extent to which such information reflects the actual quality of service delivery. Do these scorecards or report cards reflect accurately what citizens get in return for taxes or user charges, or are responses significantly influenced by personal and community characteristics? If responses are influenced by subjective factors, then it becomes difficult to compare service levels across user groups on the basis of feedback alone. For example, two individuals receiving the same service level may respond quite differently to questions about their satisfaction with service delivery, depending on their incomes or educational attainment. Similarly, relative disparities in service levels between individuals and their peer groups may influence satisfaction scores. At any given level of service, we may be less satisfied if we see that our neighbors receive better services. Such behavioral and psychological factors could distort evaluation of the actual service levels received and could therefore diminish the utility of citizen report cards in public policy making. It

appears, however, that despite the increasing popularity of these approaches in the development community, we know little about the relative magnitude of objective versus subjective factors. Adding to the difficulties in evaluating the utility of scorecards is the frequent absence of clear benchmarks for public service provision. If there are no standards to which public service providers have committed, then evaluating whether or not the provider is doing a satisfactory job becomes a subjective process that is influenced by the idiosyncratic judgment of each service user.

In this paper we investigate citizen satisfaction with various attributes of service delivery using newly available household survey data from two Indian cities. These surveys collected detailed information on households' satisfaction with various aspects of service delivery as well as information on actual service attributes. Our main objective is to examine the extent to which household and community characteristics influence a household's satisfaction with service delivery. Our basic premise is that satisfaction is determined by both the actual service levels and by expectations about service quality. The remainder of the paper is organized as follows: We present an overview of the existing literature on measuring satisfaction with service delivery in Section 2. In Section 3, we discuss some of the literature examining determinants of satisfaction. A model of satisfaction from service provision is presented in Section 4. We discuss the data in Section 5 and results in Section 6. Conclusions and policy implications are presented in Section 7.

2. Scorecards and benchmarking in public service provision

Despite recent and sometimes controversial privatization initiatives, public ownership of utilities remains the most widely adopted model for the provision of basic services in developing countries (Roth 1987, Noll et al. 2000, Estache et al. 2001). For a number of reasons, services delivered by these institutions often remain inadequate. In many rural and urban areas, large proportions of the population have little or no access to public services. The quality of services for those who receive them is often poor —characterized by low quantities provided, inconveniences imposed on the users, frequent breakdowns and unresponsive providers. At the same time, few utilities are able to recover sufficient funds to cover the full cost of service provision, let alone to invest in improvement or

extension of services within their jurisdictions. Pricing is often politically motivated with little concern for cost of provision and distribution of benefits. Subsidies—intentionally or not—frequently tend to benefit better-off residents (Hentschel and Lanjouw 2000, Walker et al. 2000).

What options do residents have to address these shortcomings in public sector performance? Hirschman's (1970) *voice* and *exit* are the main responses available to consumers confronted with inadequate goods and services. Exit is a viable strategy in competitive markets where alternative providers exist and the risk of market failure is limited. These conditions are rarely met in the basic services sectors, although private providers often play a limited role in compensating for inadequate public provision. For instance, private water vendors supply under-serviced areas in many developing country cities (e.g., Lovei and Whittington 1993) and own-provision of solid waste disposal services has been initiated in some urban areas (Dahiya 2003). However, many public services such as piped water supply, sewerage or electricity, require large capital investments to operate efficiently, have significant economies of scale and considerable network effects. Small-scale private or own provision therefore tends to be more expensive than the alternative of a well-regulated monopolistic supplier. *Exit* therefore is usually not a viable option for those who obtain public services and is, of course, an irrelevant issue for those who do not.

Voice, in contrast, is an option both for households receiving inadequate service and for those without access. Generally, voice refers to the pressure that can be exerted on public service providers by well-organized citizen groups. This may occur either directly through complaint or protest, or indirectly by influencing or participating in the political process in cases where utilities are controlled by democratically elected public officials. During the last decade, citizen groups in a number of countries have championed the use of public feedback mechanisms to improve the performance of public sector entities. The rationale behind these efforts is that due to the monopolistic nature of public service provision and prevailing public apathy, public utilities typically lack the incentives to provide the highest possible service standards. Public disclosure of these shortcomings

will exert pressure on public service providers that can lead to improvements in their performance and increase the quality of life of their customers.

A well documented example is the work by the Public Affairs Center (PAC) in Bangalore India (Paul 1998, 2002). The Bangalore report cards summarize citizens' assessment of services provided by public agencies or utilities such as the local development authority, water and sanitation board, transport authority and hospitals. In addition to overall satisfaction scores, the PAC scorecards solicit opinions about specific aspects of service provision. These include staff behavior, quality of service and communication of information. PAC also collects information on bribes paid in connection with service provision and household investments to cope with shortcomings in service provision such as water storage tanks or voltage stabilizers. Both add to the household's total cost of obtaining public services. PAC's work in Bangalore is reported to have triggered tangible efforts by the local government to improve service provision. It also led to similar work in several Indian cities (Balakrishnan and Sekhar 1998) as well as a country-wide initiative, the Millennial Survey of Public Services in India (PAC 2002).

Scorecard initiatives have not been limited to developing countries. In industrial countries the desire to improve performance of local government functions has led to the establishment of so-called benchmarking initiatives (e.g., Samuels 1998). These assess performance internally but also attempt to measure the satisfaction of the users of public services. Other examples of citizen initiatives in both developing and western countries have been reviewed by the Institute of Development Studies (Goetz and Gaventa 2001). The accumulated evidence suggests that report cards, initiatives to amplify or coordinate citizen's *voice*, and benchmarking approaches can be an effective advocacy tool. There is limited experience, however, to conclude that citizen feedback initiatives are objective instruments for measuring local government performance.

3. Determinants of satisfaction

Most scorecard initiatives seek to base their advocacy on empirical evidence mostly in the form of survey information that measures the satisfaction of citizens with various aspects of public service provision. Residents state whether or not they are satisfied or

they are asked to rank their satisfaction level on a predetermined scale. Subjective self-evaluation of perceived rankings, however, may not provide a completely accurate reflection of the reality faced by residents. The main constraints relate to measurement and context. The first issue is that reported satisfaction may not equal actual satisfaction which is unknown to anyone except the respondent. It would be virtually impossible to design a measurement approach that allows households to rank satisfaction unambiguously using the same cardinal or ordinal scale. Any interpretation of such data, however, assumes that interpersonal comparisons of the benefits or utility derived from a given level of service are consistent. The problem is similar to the one faced when analyzing utility more generally. As reviewed by Ng (1997), many economists reject attempts to measure and compare utility. For this reason, studies that analyze subjective variables such as satisfaction or happiness scores have traditionally been met with skepticism among economists. This has changed recently, in part due to the evidence accumulated by psychologists on the validity of subjective responses on topics related to utility, welfare or satisfaction (Diener et al. 1999). The second main caveat concerning the interpretation of scorecard responses is that reported satisfaction may be influenced by a multitude of contextual factors only some of which will be related to the characteristics of the service itself. Other factors such as personal and community characteristics will also influence perceptions about the quality of the service received.

There has been little empirical analysis of the determinants of satisfaction with public services. But there exist two strands of literature that are of relevance to our questions: studies on the determinants of happiness in general and satisfaction with economic status in particular, and the marketing literature on customer satisfaction. Concerning the former, Blanchflower and Oswald (2003) provide a concise list of the main determinants of self-reported well-being: circumstances, aspirations, comparison with others, and what they refer to as a person's "baseline happiness". In the context of public service delivery, the first two of these factors correspond to performance and expectations. Performance is the actual, quantifiable level of service received by the household. If scorecard initiatives are to be credible, performance should be the main determinant of perceived service delivery and thus satisfaction. Perceptions, however, are influenced by expectations—the benchmark against which a person measures actual experiences. Furthermore,

expectations may be formed by personal characteristics such as education, but they may also be influenced by the household's comparison of own service access with that of others. "Baseline satisfaction" is best considered as an idiosyncratic component that describes the willingness to put up with adverse conditions, or conversely, the tendency to complain. We could term this the *squeaky wheel* factor. Given the close relationship between determinants of happiness and satisfaction, research on happiness and welfare clearly has much to teach us in understanding satisfaction with basic service provision.

The study of perceived welfare or happiness originated in psychology but has subsequently also attracted the interest of economists (see Veenhoven 1996, Dixon 1997, Diener et al. 1999, Kahneman and Tversky 2000, Lokshin and Ravallion 2001, Blanchflower and Oswald 2003). One of the first and most significant findings was Easterlin's (1974) proposition that increases in income do not considerably increase a person's happiness. Oswald (1997), for example, confirms these findings in a study of happiness over time in the US and Britain. While average income has increased considerably over the last several decades, the proportion of survey respondents who stated that they are happy has increased much less. Thus, the general conclusion is that "*money does not buy happiness, or at least not much*" (Ng 1997). Instead, happiness in those countries was found to be correlated with being married, employed and seems to be U-shaped in age with a minimum in the early thirties.

A common theme in this literature is the importance of reference group comparison. Easterlin (1974) proposes that relative income is more important than absolute income in determining happiness. In the context of job and income satisfaction, Clark and Oswald (1996) analyze satisfaction with income among British workers. They find an inverse relationship between workers' income satisfaction and their reference or comparison income, which is derived as the predicted income for the worker based on a standard earnings equation using the entire cross-sectional data set. Workers' satisfaction, according to this analysis, is less influenced by absolute income levels, than by how that income compares to that of similar persons with similar jobs. This confirmed earlier work on reference group effects that indicates that unemployed workers in Britain who live in areas of high unemployment show less mental distress—i.e., are less unhappy—than

those in areas of low unemployment (Clark and Oswald 1994). Frank (1997) discusses the issue of reference groups more generally and concludes that satisfaction is greatly influenced by the individual's or household's relative position. One manifestation of this is the desire of people to "*keep up with the Jones*".

Another strand of the satisfaction literature has its origin in the field of consumer research and marketing. Customer satisfaction is a pre-requisite for customer loyalty. Consequently, there has been a lot of interest in determining what drives consumer satisfaction. This research draws extensively on the psychology literature. Marketing research has identified two main models of satisfaction that differ significantly in how performance and expectations are linked (Johnson et al. 1995 and 1996; see also Sasser et al. 1978, Boulding et al. 1993, Driver 2002). The *disconfirmation model* assumes that satisfaction is the difference between performance and expectations. If performance is equal to or higher than expectations, the customer is satisfied. If expectations exceed performance, the customer is dissatisfied. This implies that the absolute level of product or service performance does not need to influence satisfaction directly. For instance, a poor household with low expectations may find that relatively low service quality still exceeds these expectations. The household may thus be as satisfied as a rich household with high expectations and much better service availability. Expectations thus serve as a standard of reference that reflects opinions about what the service provider *should* deliver. Obviously, these could be far from realistic.

An alternative approach that has gained increasing following in marketing is the *performance model* in which both product or service quality and expectations affect satisfaction levels positively. The performance model assumes that expectations serve as an "anchor" to the evaluation of performance. Performance, as perceived by the customer then determines satisfaction levels. Customers are assumed to continuously adjust their expectations as they experience the products or services. They will thus have a (more or less) realistic idea of what the service provider *will* deliver. Expectations and performance will therefore never vary by much and both could therefore be positively related to satisfaction levels. Johnson et al. (1996) point out that this model is similar to

the cognitive process of anchoring and adjustment described by Tversky and Kahneman (1974).[1]

4. A model of satisfaction from service provision

The evidence reviewed in the previous section informs our model of satisfaction with basic urban services, in this case water supply. In this model, utility—i.e., satisfaction with service delivery—is a function of actual service performance and the person's expectations about service performance. Thus in our framework, $U = f(A, E)$, where U represents utility or the perceived satisfaction derived from provision of a service. A represents a vector of characteristics describing the quality and quantity of the service received by the individual, and E is a vector of individual and community characteristics that determine a person's expectations about service performance.

Service performance is the actual level of service provided and available to the household. It consists of measurable aspects such as the quantity provided, the frequency at which the service is available and the quality of the product delivered. Most of these can be measured with some degree of accuracy to yield indicators such as the quantity of water provided to households, the number of days on which water is available or the purity of the water coming out of the tap. But public service delivery also has aspects that are less easily quantified, for example, the responsiveness of the provider in addressing service problems or the courtesy of its representatives in their interaction with the general public.[2]

In evaluating satisfaction with public services, individuals compare actual levels of service performance with their expectations about service performance. There are two ways through which these expectations might be formed. The household may compare the actual level of service received to what the public utility *will* likely provide given past experience. For instance, poor performance in the past will lead the household to expect

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[1] See also Kahneman et al. 1999. Johnson et al. (1996) discuss two additional models. The *rational expectations model*, assumes—along the lines of the original rational expectations theory (Muth 1961)—that perceived performance and expectations are essentially identical. For complex products or services in which performance influences satisfaction directly, they argue that performance and expectations have a positive relationship without expectations affecting satisfaction directly.

[2] These issues are extensively studied in the marketing literature on the provision of private goods (Driver 2002).

poor performance in the future. Alternatively, the expectation may be formed by some assessment of what the public utility *should* provide according to some idealized, but possibly unrealistic, benchmark. This benchmark might be determined arbitrarily, such as around-the-clock water supply in a city where households typically receive water for a few hours every other day. In the context of public service provision, we initially favor the performance model of consumer satisfaction. We believe that households who experience actual levels of service delivery every day are likely to anchor their expectations to the actual performance of the utility. They are thus not assumed to have unrealistic expectations about what providers could potentially deliver.

Direct measurement of expectations is clearly as difficult as measuring satisfaction itself. We assume that expectations are influenced by various individual and/or household attributes. These may include age (Duffy 2000), education (Clark and Oswald 1996), and ethnicity (Bartel et al. 1996), as well as welfare status, tenure arrangements and gender. Education, for instance, may increase aspirations and consequently expectations concerning the level of services received in return for user fees or taxes. Furthermore, more educated citizens might be less reluctant to confront providers of public services and more willing to complain about inadequate service provision. Higher education levels might therefore be associated with lower satisfaction scores. Gender may influence expectations in two, possibly contradictory, ways. If there are intra-household differences in the coping costs of inadequate water supply—for example where households need to rely on public taps—it is often women who bear the burden of obtaining water several times a day. Their perception of services received will be different and their dissatisfaction will consequently be larger than that for household members who do not share this burden. For the same reason, however, women may be better informed about the actual level of service provision. If the performance model holds, they should be more likely to anchor their expectations around actual service delivery. In that case, women may not show lower satisfaction levels, all else being equal. We also assume that home owners have higher expectations concerning public service provision than short-term renters, since the quality of services directly affects the value of the dwelling unit and because owners are likely to remain in the same dwelling for a longer period of time.

We define satisfaction or utility from water supply as a standard microeconomic model of household behavior:

$$U = u(p(w), i, j, x\text{-}c(w)) \qquad (1a)$$

where $p(w)$ represents the attributes of service performance such as the quantity and quality of water provision and j represents additional supply characteristics, such as the type and location of water supply. Further, i represents individual and household specific characteristics influencing expectations about water supply provision and $x\text{-}c(w)$ is the utility from consumption of other goods less the expenditure on water. In this model, satisfaction or perceived utility from water supply is increasing in service availability and consumption of other goods, subject to expenditures on water. This is because utility will decrease with higher cost of water procurement, $c(w)$.

Relative service performance in reference group

While we believe that households have realistic expectations concerning service delivery, evidence from the psychology and happiness literature suggests that additional factors influence expectations and thus satisfaction levels. Moving beyond the traditional utility maximizing framework in (*1a*), we assume that relative performance—the quality of service received in comparison with that received by others—will modify expectations and therefore perceived performance and thus satisfaction. We modify (1a) to consider service performance in the household's reference group:

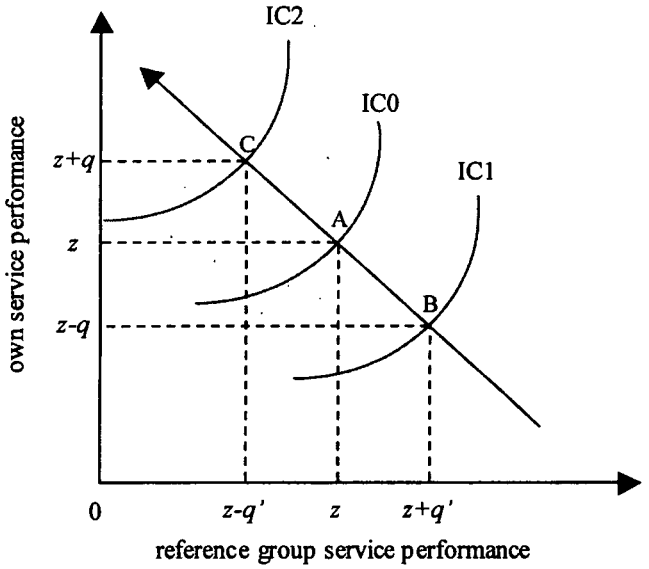
$$U = u(p(w), p(w^*), i, j, x\text{-}c(w)) \qquad (1b)$$

where $p(w^*)$ represents relative service performance in the reference group. Perceived utility from water supply is an increasing function of a household's own service performance and is also influenced by reference group performance. For instance, utility could be an increasing function of the difference or ratio between service performance for the household and that of its reference group. Thus, if a household receives poorer service than its peer group, it is likely that its expectation is higher than actual performance and satisfaction is therefore low. Satisfaction is likely to be higher, if the household's peer group receives equal or worse services, even if the absolute level of service provision is

inadequate. In other words, shortcomings in service delivery may be more acceptable when all neighbors or social acquaintances are in the same situation, but unacceptable when the household is the only one suffering from low quality services. This suggests that *relative deprivation*, in addition to the absolute service level, is critically important in determining satisfaction. Incorporating reference group service levels thus has the effect of moving from the performance model (assuming "*will* expectations") towards the disconfirmation model ("*should* expectations").

Figure 1 illustrates the assumptions underlying our model of reference group effects on satisfaction. Service levels in the household's reference group are on the *x*-axis and own service levels are on the *y*-axis. Utility, or in this case satisfaction from services increases from the south east to the north west section of the graph. This means that satisfaction increases as own service levels improve in comparison to the reference group (indifference curve IC0 to IC2). Point *A* on IC0 shows satisfaction levels (or utility) when the household receives the same service level as its reference group (z). At *A*, performance equals expectations, and the household will be satisfied by the service level received. Satisfaction decreases as we move to indifference curve IC1 when service levels in the reference group (z+q') are higher than that for the household (z-q, where q does not need to equal q'). At point B, the "*should* expectations" are higher than performance and the household perceives *relative deprivation*, thereby reducing its satisfaction from service provision. On the other hand, at point C on curve IC2, service levels for the household (z+q) are higher than the reference group (z-q'). In this case, performance is better than expectations and the household perceives higher satisfaction from service provision.

Figure 1: Own versus reference group service performance



Specification

As described in equation (*1b*) and Figure 1, satisfaction from services is a function of a household's own service levels and the relative service level in the reference group controlling for other individual or group characteristics. Our interest is in explicitly measuring relative performance—i.e., reference group performance relative to own performance. Rather than using reference group performance (P^*) on its own, as for example in the case of comparison income in Clark and Oswald (1996), we therefore use the *'ratio comparisons'* model specification suggested by Clark and Oswald (1998). Satisfaction from services is thus defined as:

$$S_i^* = \alpha' P_i + \tau' \left(\frac{P_i}{P^*} \right) + \delta' I_i + \gamma' Y_i + \varepsilon_i \qquad (2)$$

where S_i^* is the household's satisfaction or utility from attributes of service delivery, P_i measures the household's own service performance and P^* represents service levels in the household's reference group. The term $\left(\frac{P_i}{P^*} \right)$ is the ratio of the service level between the household and its reference group. The household receives satisfaction from

improvements in its own service levels (α`) as well as from surpassing its peers ($\tau$`) when $P_i > P^*$. Conversely, satisfaction is reduced if $P_i < P^*$.[3] The basic premise of this specification is that utility (or in this case, satisfaction) depends upon a convex combination of a direct private component of utility and a status or comparison oriented element of utility (Clark and Oswald 1998). In addition to the service performance variables, other factors influencing satisfaction include I_i, which represents a set of individual, household and service-specific characteristics, and Y_i are the benefits from consumption of other products. Finally, ε_i is a normally-distributed error term with mean zero and variance σ.

The definition of the household's reference group is not straightforward because, in most cases, actual interaction cannot be easily observed. In welfare studies it has been possible to estimate a generic reference value of the variable of interest. For instance, Clark and Oswald (1996) use an earnings regression to predict a reference wage for workers. The deviation between the actual to the reference wage determines the worker's satisfaction with current income (if the predicted wage is less than the actual wage) or dissatisfaction (if current earnings are lower than those for the worker's hypothetical peers). This abstract concept of a reference group can be contrasted with more direct definitions. One obvious possibility is to define this reference group spatially. Households will tend to interact mostly with other households nearby and will thus be aware of the levels of service provision nearby.

An alternative assumption is that reference groups are defined socially rather than geographically. Much of the community participation literature, for example, assumes that people tend to interact most with others who are similar to themselves (e.g., Alesina and La Ferrara 2000; see also Lall *et al.* 2002). Similarity may then be defined by a common socioeconomic standing, religion or ethnicity. For example, among well-off residents, regardless of their place of residence, information might be exchanged at the golf club rather than across the backyard fence. The same may not hold for lower income

[3] Clark and Oswald (1998) analytically show that rise in others' actions or in this case, improvements in service quality, induces the individual to increase his or her action (service quality). This holds true if utility is comparison-concave. However, individuals with utility functions linear in comparisons act independently of other people, and individuals with comparison-convex utility do the opposite of others.

groups who have a smaller activity space, although they, too, may exchange information largely among their social peers in local religious organizations, community centers, or markets.

As is common in the analysis of a subjective response variable, we do not observe the household's utility or satisfaction level S_i^* directly. We can only observe the household's evaluation of (2). In evaluating its own satisfaction level, the household selects among a set of response categories the one which most closely matches its underlying assessment of service quality. We do not know, however, whether the difference between 'somewhat satisfied' and 'satisfied', for instance, is the same as that between 'neutral' and 'somewhat satisfied'. The appropriate statistical approach therefore is estimation using the ordered probit model, which determines the threshold parameters together with the coefficients of the explanatory variables, and yields the probabilities that a household's actual satisfaction will match each of the five categories.

5. Data

Two comprehensive household survey data sets for the cities of Bangalore and Jaipur in India provide an opportunity to empirically test the model of satisfaction with public services. The survey methodology for both cities is largely identical (see Deichmann et al. 2003). Bangalore, in the Southern Indian state of Karnataka, is a global center for software development and back-office services such as call centers. It is one of the wealthiest cities in India with a rapidly growing middle class. However, much of the development has taken place in the outskirts of the city within largely self-contained clusters of high tech establishments. Spillovers from this dynamic sector to the general population occur through procurement of complementary services and an increase in the tax base. But large disparities in living standards remain, with 7.6 percent of the population of approximately 5.6 million in 2000 living in squatter settlements and slums, which are distributed throughout the city. Jaipur, with a population of 2.1 million in 2000, is the capital of the Western state of Rajasthan and is located approximately 250km southwest of Delhi. It is a regional trade and service center and has a large tourist industry.

The Bangalore survey was conducted in 2001 and includes 2905 households. In the city of Jaipur, 1500 households were surveyed in 2002.[4] Households were selected completely randomly across each city with sample size proportional to the number of households within city wards. The surveys provide detailed information on household expenditures and own production, which yields a comprehensive measure of each household's welfare status based on standard conventions (Deaton 1997, Deaton and Zaidi 2000). The surveys also include information on household member characteristics, access to basic public services and housing. The services section focuses on water supply including the types of water sources, quantity of water consumed, distance to water sources and other indirect costs for households without piped water connections, and investments that the household has made to cope with intermittent service provision. The survey asked each household about their satisfaction levels with various aspects of water service provision. Some households use more than one water source—a common strategy to cope with unreliable supply (Zerah 1998). In these households satisfaction information was collected for each source so that the number of observations in our study is larger than the number of households (3435 in Bangalore and 1603 in Jaipur).

All variables are described in Table 1. In the empirical analysis in the following section we focus on satisfaction with the *duration* of water supply (hours per day). Other satisfaction studies, of income or general happiness, use the individual as the unit of observation. In our application, the responses represent households with the best informed household member available at the interview time answering for the household. Actual performance is obviously the same for all household members, but the perception of performance and therefore satisfaction may be influenced by the personal characteristics of the respondent. Alternatively, it could be dominated by the characteristics of the household head regardless of who answered the survey.

Households in each sample were asked to rank their satisfaction with aspects of service delivery on a five-tier scale. The first two responses denote that the household is dissatisfied or somewhat dissatisfied, three is a neutral response, and the remaining

[4] The Jaipur survey also covered about one thousand households in ten outlying municipalities that are as far as 100 km from the city. Although these are considered part of the Jaipur Urban District, we did not include them in our analysis.

categories indicate that the household is somewhat satisfied or satisfied. Since the survey's purpose was much broader than investigating service provider performance, there was no special introduction to the satisfaction section. This should preclude any negative biases in responses that may arise, if the survey is introduced to the respondent explicitly as a means to improve local government performance.

Overall, satisfaction with water services is quite high. Table 2 shows satisfaction scores by household consumption quintiles. In Bangalore, 54 percent of households state that they are satisfied with duration of water supply.[5] Satisfaction scores are higher for wealthier households but even in the poorest consumption quintile, 44 percent of respondents are satisfied with duration. Disaggregated results by type of water source (not shown here) indicate that among users of public taps, 38 percent report being satisfied versus 18 percent dissatisfied with the duration of water supply, compared to 49 percent versus 9 percent of residents with individual connections. Overall, satisfaction is highest among users of individual hand pumps or tubewells and mini water systems (local, informal water distribution networks), although these types of sources are much less common. On other aspects of water provision, for all sources combined, 59 percent of respondents were satisfied with the frequency of water supply (days per week), 60 percent with water pressure, 65 percent with water charges and 48 percent with water quality.

These values for Bangalore are considerably different from the initial report card results reported by Paul (1998) for the same city. That survey, which was conducted in 1993/94, found that only four percent of non-poor households were satisfied or very satisfied with the Bangalore Water Supply and Sewerage Board or BWSSB (answers of 6 or 7 on a seven-category scale), while 46 percent were dissatisfied or very dissatisfied (1 or 2). When asked specifically about the quality of the service provided by BWSSB, 13 percent of respondents reported being satisfied.[6] In comparison to the new figures collected in 2001, this suggests a considerable improvement in the performance of the water utility

[5] Strictly speaking the percentages refer to the number of water sources for which households responded, with a small number of households evaluating satisfaction for two or more sources separately (e.g., piped water and hand pump).

[6] 26 percent were reported to be satisfied with *Staff Behavior* and 18 percent with *Information Provided.*

following the public pressure exerted by the Bangalore report card initiative. In fact, a re-survey in 1999 (Paul 2002) showed considerably higher satisfaction scores. Among middle-class households, 42 percent stated that they were satisfied with the overall performance of the water supply agency, with 51 percent stating that there had been improvement in the previous three years. For poor households, the corresponding figures were 62 and 59 percent. It should be kept in mind, however, that there are significant differences in sample selection and size among the surveys. The first report card initiative used a stratification of city areas based on the age of the locality. 807 households were then selected from among middle and upper income households and 327 from poor households. The second report card survey included 1339 middle class and 839 poor households. Welfare status was defined by residence in a slum rather than by household consumption or income. Paul (1998) estimates that poor households comprise about ten percent of the total city population which is close to the number of residents in informal settlements in the 2001 survey. Different interview methods and questions were used for better-off versus poorer households since the services of interest among those groups were assumed to differ.

Results for Jaipur indicate that 41 percent of households are satisfied with duration of water supply and 22 percent are dissatisfied. 32 percent of households in the poorest consumption quintile are dissatisfied with this aspect of water supply. Among other aspects of water supply in Jaipur almost all households (95 percent) are satisfied with frequency, since water is generally available on every day of the week for all households. Table 3 shows that satisfaction levels appear to be related to actual performance of the service provider. In Bangalore, respondents who stated that they are satisfied received water for more than 11 hours per day that water is available, compared to 7-8 hours for respondents who were not fully satisfied. In Jaipur the results are even more pronounced. Satisfied respondents received water for almost 14 hours per day compared to about 3 for others.

6. Estimation results

Table 4 and Table 5 present the results of ordered probit estimations for satisfaction with the duration of water supply in Bangalore and Jaipur (equation (2)). We present eight sets

of estimation results for each city to evaluate their robustness across different specifications. Columns 1-4 in each table present results using geographic neighborhood as the reference group. For each household, the reference group is comprised of the closest 20 neighbors determined using geographic household coordinates collected during the survey.[7] In columns 5-8, in contrast, we define the reference or peer group in terms of their social and economic similarity under the assumption that households most likely compare their own service status to that of households with similar culture and welfare. Peer groups are defined by having a common mother tongue (ethnolinguistic similarity) and a similar welfare status as defined by per capita consumption quantiles. In the empirical application, welfare status has been classified into three and mother tongue into four categories. We thus obtain twelve peer groups in each city based on social and economic similarity, which represent four language groups for each of three welfare categories.

Within each reference group definition, estimations are given for specifications where the individual specific variables (education, age, sex) are those of the household head versus those of the respondent. Given that our unit of analysis is the household rather than the individual, we have no *a priori* insight as to which may be more important. The overlap of the two is far from complete. In Bangalore, only 28 percent of the respondents are also the head of the household. In Jaipur the proportion is 37 percent. The remaining distinction in the tables is between models with and without fixed effects. For Bangalore, we include dummy variables for the six BWSSB water divisions that are geographically defined and separately managed, as well as for groups of similar water sources. Since there are no water divisions in Jaipur we include only source type fixed effects in Table 5. To facilitate interpretation of the results, we also provide selected marginal effects in Table 6 and Table 7. Rather than showing the effects for each satisfaction score, we concentrate here on the effects of the independent variables on the probability of being satisfied with the duration of water supply (satisfaction score = 5). The tables refer to models with individual specific characteristics of the household head.

[7] The choice of the number of neighbors is somewhat arbitrary, since the true structure of interaction among neighbors is unknown. We tested specifications with 15-25 neighbors, but found that the empirical results are not significantly affected.

The estimated coefficients for 'hours per day' (HPD) in Tables 4 and 5 test the significance of service provider performance on household satisfaction. We find that the direct benefits from own service quality are positive and significant when we use geographic neighbors as the reference group in Bangalore and for all specifications in Jaipur. The estimated coefficients for own service improvements are not statistically significant for households in Bangalore when the reference group is based on economic and social similarity. Tables 6 and 7 show the marginal impact of increasing water availability by one hour per day on the probability of being satisfied. The impacts are quite small in the Bangalore, with the estimated marginal effects (using geographic neighbors) ranging from 0.08 to 1.3 percent. The effects are larger in Jaipur. Increasing water availability by an additional hour per day increases the probability of being satisfied by 1.6 to 3.8 percent. For illustrative purposes, we use the estimated coefficients from Table 5 (column 1) to show the impact of improving water availability from the minimum of one hour per day to the maximum of twenty-four hours in Jaipur. This improvement would increase the probability that the household is satisfied from 20 percent to 92 percent.

The finding that a larger number of hours that water is available will increase satisfaction with this aspect of water supply is, of course, intuitive. Otherwise there would be no rationale for satisfaction surveys. The main question considered here is if other factors also matter when controlling for objective indicators of service quality. The coefficients for *relative HPD* in Tables 4 to 7 provide estimates of the importance of reference or peer group performance in determining satisfaction. It is defined as the natural logarithm of the ratio of own versus reference group hours per day and varies theoretically from –3.18, where the household receives water for only one hour and the reference group for twenty four hours, to +3.18 in the opposite case.

Our results for Bangalore show that households receive positive and significant utility from having better service levels than their reference group. This means that satisfaction with service provision increases, as the households' service level improves relative to that of its reference group. The estimated coefficients are larger when the reference group is defined in terms of social and economic similarity. The marginal effects in Tables 6 and 7

show the increase in the probability that the household is satisfied with a one unit change in the natural log of the ratio of the household's service levels relative to its reference group. This corresponds, for example, to a change from a situation where the household receives water for about one third of the number of hours of the reference group, to one where both receive water for the same number of hours.

For Bangalore, in Table 6, the marginal effects show that a one unit increase in 'relative HPD' increases satisfaction by 5.5-6.4 percent when the reference group is defined geographically, and about 17 percent when the reference group is based on economic and social similarity. This suggests that the interaction among 'social' peers is stronger than among spatially proximate neighbors. We should, however, keep in mind that the effects of own service quality in Bangalore are insignificant when the reference group is based on a socioeconomic characteristics. This would imply that utility or satisfaction in this case comes largely from inter-household comparisons.

The results are similar for Jaipur. Table 5 shows that 'relative HPD' is not significant when we use geographic neighbors, but positive and significant when we use economic and social similarity to define the reference group. The marginal effects reported in Table 7 indicate that a one-unit increase in 'relative HPD' increases satisfaction by 15-17 percent, when the reference group is based on economic and social similarity. These results for Bangalore and Jaipur support our hypothesis that satisfaction or utility is not only a function of a household's own condition, but is also driven by relative status vis-à-vis its reference group. We also find that interaction or comparative evaluation of service performance may be more important among households sharing common economic and social characteristics, rather than among those that live nearby.

Among the household level variables, the welfare level has a consistently strong and positive effect in both cities on the household's satisfaction with the duration of water supply. We measure household welfare as total annual household consumption net of expenditures for water and control for household size separately. In Jaipur, for example, a one-unit rise from the mean of the log of household consumption—i.e., from 103,817 to 282,203 rupees—increases the probability that the household is satisfied by about 14 to

18 percent. This is a reflection of the fact that wealthier households tend to have individual water connections and are able to make complementary investments in water pumps and storage tanks. They are therefore sheltered from the nuisance of intermittent water supply.

Homeownership and long term tenancy (*tenure status*) has a significant and negative effect on satisfaction levels in Bangalore. The parameter estimates are only marginally significant or insignificant in Jaipur, which is most likely a reflection of the very large number of home owners (90 percent). In addition to home owners, we include long-term renters who have lived in their dwelling for twenty years or more. In most Indian cities, rent controls and other housing market regulations make it likely that long term tenants have the same incentives as home owners. The negative sign for the tenure variable coefficients suggest that owners and long term tenants tend to be less satisfied with the duration of water supply than short term renters. Tables 6 and 7 indicate that, on average, satisfaction levels for homeowners are lower by about 6 percent. There may be several reasons for this finding. Homeowners have higher expectations for service provision since the quality of service access will be directly reflected in the home value. Longer term residents also have a higher stake in having good services compared to transitional or short-term residents. In addition, home owners are likely to interact with service providers directly, while many renters pay for services through their rental payment. Homeowners will thus experience any shortcomings in provider responsiveness personally, which may be reflected in lower satisfaction scores. Finally among household level variables, an increase in household size decreases satisfaction, since larger families have greater water requirements. Inadequate service provision will therefore result in greater dissatisfaction.

Most of the individual specific variables have no significant effect on the satisfaction levels of households regardless whether we use characteristics of the household head or those of the respondent. The exception are the coefficients for female headed households in Bangalore, which are positive and significant. We should not over-interpret this result given the inconsistencies across specifications. However it is interesting that the coefficient signs for this variable in most specifications suggest that females tend to be

more satisfied with the duration of water supply than males. This is a counter-intuitive finding since we would expect that females carry a greater share of the burden in water collection. Female headed households are likely to be poorer and have generally lower levels of service availability. The only credible explanation is that females, being more involved in water procurement, have a more realistic expectation of actual service performance, and are more likely to base satisfaction responses on what the service utility *will* provide rather than what it *should* deliver. In general, however, these results for individual level variables confirm that any positive or negative experience concerning the quality of basic services is shared among all household members, so that we can expect consistent responses regardless of who in the household responds to a scorecard type question.

7. Conclusions

The economics of basic services favor large-scale provision by public or private monopolies. In the absence of market mechanisms, a utility's customers have little recourse if service provision remains inadequate. Citizen groups and development agencies consider satisfaction surveys or report cards evaluating public service delivery an effective 'voice' mechanism to exert pressure on providers to improve performance. Donors and multilateral institutions see public disclosure of such information as an important tool for increasing governance and empowerment at the local and national level. But there is surprisingly little evidence on what such surveys actually measure and how well people's stated perceptions reflect actual service levels. In any such effort there is the risk of capture of benefits from public action by those who are best organized or who scream the loudest. This paper investigated whether the "squeaky wheel" effect dominates in scorecard initiatives or whether they can truly be considered an effective tool for improved, information-based public management.

Our findings generally support the case for scorecards. In carefully administered surveys in the cities of Bangalore and Jaipur, stated satisfaction with the duration of water supply generally reflect the actual availability of water at the household level. Household satisfaction with the public utility's performance tends to increase with an increase in the

hours per day that water is available. Conversely, those households who are less satisfied tend to have less dependable water supply.

Satisfaction, however, is a subjective measure that is not easily benchmarked on an objective scale. Factors other than actual service provider performance do play a role in determining satisfaction with water services. One issue of particular interest is whether findings from the welfare and happiness literature about the influence of reference group characteristics also hold for satisfaction surveys. We find evidence that this is the case, confirming that household's expectations are, in part, influenced by what they see among their neighbors or peers, even after controlling for the actual level of service availability. Households that are better off than their neighbors tend to be more satisfied and vice versa. These results are consistent for Bangalore for both reference group definitions and for Jaipur when the peer group is defined by culture and welfare. The implication is that peer group effects are clearly relevant, but that their definition requires considerable insights into the nature of social relations in a particular setting. An important policy implication is that overall satisfaction is to some extent a function of equality of service access. Everything else being equal, households would be more satisfied if service levels do not deviate significantly from those of their reference groups. Investment could thus be targeted specifically at reducing unequal service access by bringing the worst off neighborhoods up to the level of their peers.

In addition to performance and peer group effects, household level characteristics matter in determining satisfaction levels. Wealthier households can make complementary investments such as storage tanks and tend to be more satisfied. Homeowners tend to be less satisfied, all else being equal. Their expectations are higher since they expect to live in the dwelling unit for longer and service quality will be reflected in the value of their home.

These results provide a cautious endorsement for scorecard initiatives as a tool for policy dialogue. A caveat of any user survey, however, is that the way in which the question is asked can have a significant impact on the answers. This certainly applies to opinion surveys, but, to a lesser degree, even to surveys that ask respondents to judge their own

experience. Scorecard initiatives can misrepresent actual conditions just as selective disclosure of information by public utilities may mislead the public. They will be counterproductive, if they do not include objective measures of service quality that are based on clear standards, do not account for complementary characteristics of respondents, or if they are framed using an activist perspective. In any case, results from opinion or satisfaction surveys need to be interpreted carefully, including those reported here. The potential benefits from such feedback for improving service provision by public utilities, however, are undeniable. Those benefits can only be achieved, however, if the service provider is responsive. Transparency and accountability are often lacking among public utilities. Where providers are willing to issue clearly defined benchmarks to which users can compare their own service levels, many of the caveats discussed in this paper apply to a much lesser degree. In those cases, independent scorecard initiatives can be a truly effective tool for holding the public sector to account.

8. References

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Table 1: Variables

		Bangalore		Jaipur	
Variable	Description	Mean	Std. dev	Mean	Std. dev
Dependent variable					
Satisfaction with duration	Household satisfaction with duration of water supply: 1 = Dissatisfied; 2 = Somewhat dissatisfied; 3 = Neutral; 4 = Somewhat satisfied; 5 = Satisfied	3.90	1.41	3.42	1.64
Performance					
Hours per day (HPD)	Duration of water supply: Hours per day that water is available from the water source	9.61	7.81	7.37	9.06
Ref. group HPD	Log of ratio of own HPD versus HPD of geographic neighbors	-0.23	0.82	-0.41	1.06
	Log of ratio of own HPD versus HPD of socioeconomic peer group	-0.32	0.81	-0.70	1.17
Household characteristics					
Welfare status	Log of annual household consumption in Rupees net of expenditures for water	11.63	0.54	11.54	0.51
Tenure status	Household owns dwelling unit or has lived in same unit for 20 years or more	0.64	—	0.90	—
Household size	Log of the number of persons in household	1.48	0.36	1.63	0.45
Individual characteristics					
Education	Household head has at least a high school degree	0.76	—	0.74	—
	Respondent has at least a high school degree	0.74	—	0.73	—
Age	Log of age of household head	3.83	0.26	3.85	0.29
	Log of age of respondent	3.59	0.39	3.57	0.39
Sex	Gender of household head: Female = 1, Male = 0,	0.07	—	0.06	—
	Gender of respondent: Female = 1, Male = 0,	0.61	—	0.57	—
Fixed effects					
Water divisions	Available for Bangalore only: five BWSSB water zones plus one zone for households outside of the BWSSB area				
Source type	1 = Individual/piped water connection or sub-connection	0.66	—	0.78	—
Source type	2 = Individual handpump, tubewell or mini water system	0.12	—	0.12	—
Source type	3 = Community tube well, tap or hand pump	0.21	—	0.05	—
Source type	4 = Water tanker, other vendor, or surface water	0.01	—	0.06	—

Table 2: Satisfaction with duration of water supply by welfare status (percent)

	Consumption quintile					
	I	**II**	**III**	**IV**	**V**	**All**
Bangalore						
Dissatisfied	17.3	11.6	9.0	6.8	4.1	9.9
Somewhat dissatisfied	16.4	15.7	13.5	9.6	7.7	12.6
Neutral	6.8	8.7	8.1	6.9	6.8	7.5
Somewhat satisfied	15.0	18.0	17.0	15.5	16.8	16.5
Satisfied	44.4	46.1	52.3	61.2	64.7	53.5
Jaipur						
Dissatisfied	32.1	23.6	21.4	19.1	13.6	22.0
Somewhat dissatisfied	12.5	14.6	19.9	16.9	10.7	14.9
Neutral	2.2	4.5	4.3	2.5	2.8	3.3
Somewhat satisfied	16.8	17.2	16.1	19.4	23.7	18.6
Satisfied	36.4	40.1	38.2	42.2	49.2	41.2

Table 3: Satisfaction and performance

	Bangalore		**Jaipur**	
Satisfaction	Avg. hours per day	Std. deviation	Avg. hours per day	Std. deviation
Dissatisfied	7.2	7.4	3.3	6.2
Somewhat dissatisfied	7.2	6.8	2.4	3.8
Neutral	7.7	6.5	2.9	5.3
Somewhat satisfied	7.6	5.9	2.5	3.0
Satisfied	11.6	8.3	13.9	10.5
Total	9.6	7.8	7.3	9.4

Table 4: Satisfaction estimation for duration of water supply (Bangalore)

	Reference group defined geographically				Reference group defined by language/welfare			
	Household head characteristics		Respondent characteristics		Household head characteristics		Respondent characteristics	
Hours per day	0.020	0.032	0.020	0.032	-0.007	0.001	-0.007	0.001
	(0.006)**	(0.007)**	(0.006)**	(0.007)**	(0.010)	(0.010)	(0.010)	(0.010)
Relative HPD	0.187	0.167	0.186	0.166	0.444	0.438	0.447	0.441
	(0.053)**	(0.057)**	(0.053)**	(0.057)**	(0.066)**	(0.072)**	(0.066)**	(0.072)**
Welfare status	0.389	0.226	0.389	0.218	0.399	0.232	0.399	0.224
	(0.043)**	(0.046)**	(0.043)**	(0.045)**	(0.043)**	(0.046)**	(0.042)**	(0.045)**
Tenure status	-0.182	-0.164	-0.159	-0.147	-0.178	-0.163	-0.156	-0.147
	(0.044)**	(0.044)**	(0.044)**	(0.044)**	(0.044)**	(0.044)**	(0.044)**	(0.044)**
Household size	-0.267	-0.182	-0.249	-0.172	-0.285	-0.196	-0.267	-0.186
	(0.062)**	(0.063)**	(0.060)**	(0.061)**	(0.062)**	(0.063)**	(0.060)**	(0.060)**
Education	0.064	0.017	0.085	0.042	0.061	0.013	0.083	0.040
	(0.050)	(0.050)	(0.048)+	(0.050)	(0.050)	(0.050)	(0.048)+	(0.050)
Age	0.162	0.073	0.049	0.014	0.161	0.072	0.047	0.011
	(0.084)+	(0.080)	(0.050)	(0.060)	(0.083)+	(0.080)	(0.050)	(0.060)
Sex	0.244	0.248	0.075	0.065	0.226	0.231	0.061	0.052
	(0.081)**	(0.083)**	(0.042)+	(0.040)	(0.082)**	(0.083)**	(0.040)	(0.040)
Water division 2		-0.031		-0.042		-0.032		-0.042
		(0.070)		(0.070)		(0.070)		(0.070)
Water division 3		-0.057		-0.065		-0.081		-0.088
		(0.070)		(0.060)		(0.070)		(0.060)
Water division 4		0.106		0.101		0.077		0.072
		(0.070)		(0.070)		(0.070)		(0.070)
Water division 5		0.102		0.101		0.062		0.060
		(0.080)		(0.080)		(0.080)		(0.080)
Water division 6		-0.208		-0.237		-0.247		-0.274
		(0.150)		(0.150)		(0.145)+		(0.146)+
Source type 1		0.753		0.741		0.700		0.688
		(0.216)**		(0.218)**		(0.220)**		(0.222)**
Source type 2		0.549		0.535		0.593		0.578
		(0.231)*		(0.233)*		(0.235)*		(0.238)*
Source type 3		0.224		0.216		0.175		0.166
		(0.220)		(0.220)		(0.220)		(0.220)
Log Likelihood	-4226.751	-4170.233	-4238.805	-4181.672	-4207.885	-4153.279	-4219.715	-4164.596
Likelihood ratio	354.507	467.543	351.856	466.122	392.239	501.451	390.038	500.275
Prob > LR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Robust standard errors in parentheses
+ significant at 10 percent; * significant at 5 percent; ** significant at 1 percent

Table 5:Satisfaction estimation for duration of water supply (Jaipur)

	Reference group defined geographically				Reference group defined by language/welfare			
	Household head characteristics		Respondent characteristics		Household head characteristics		Respondent characteristics	
Hours per day	0.096	0.095	0.097	0.094	0.040	0.030	0.041	0.030
	(0.007)**	(0.008)**	(0.007)**	(0.008)**	(0.011)**	(0.011)**	(0.010)**	(0.011)**
Relative HPD	-0.078	-0.068	-0.080	-0.069	0.387	0.429	0.385	0.428
	(0.053)	(0.044)	(0.053)	(0.044)	(0.072)**	(0.071)**	(0.072)**	(0.071)**
Welfare status	0.450	0.427	0.405	0.375	0.383	0.353	0.342	0.305
	(0.066)**	(0.068)**	(0.064)**	(0.067)**	(0.067)**	(0.070)**	(0.066)**	(0.068)**
Tenure status	-0.168	-0.169	-0.196	-0.197	-0.166	-0.164	-0.195	-0.192
	(0.103)	(0.102)+	(0.102)+	(0.101)+	(0.104)	(0.104)	(0.103)+	(0.103)+
Household size	-0.267	-0.262	-0.273	-0.269	-0.239	-0.236	-0.246	-0.244
	(0.072)**	(0.073)**	(0.071)**	(0.071)**	(0.073)**	(0.073)**	(0.071)**	(0.071)**
Education	-0.049	-0.047	0.028	0.037	-0.046	-0.042	0.020	0.032
	(0.067)	(0.068)	(0.070)	(0.070)	(0.068)	(0.068)	(0.070)	(0.070)
Age	-0.196	-0.213	-0.065	-0.070	-0.194	-0.212	-0.064	-0.070
	(0.114)+	(0.113)+	(0.074)	(0.075)	(0.115)+	(0.115)+	(0.074)	(0.075)
Sex	-0.136	-0.121	0.059	0.062	-0.143	-0.118	0.048	0.056
	(0.118)	(0.120)	(0.060)	(0.060)	(0.119)	(0.121)	(0.060)	(0.060)
Source type 1		0.332		0.339		0.494		0.499
		(0.199)+		(0.199)+		(0.196)*		(0.196)*
Source type 2		-0.033		-0.064		-0.123		-0.152
		(0.144)		(0.144)		(0.147)		(0.146)
Source type 3		-0.298		-0.288		-0.162		-0.155
		(0.222)		(0.223)		(0.222)		(0.222)
Log Likelihood	-1953.444	-1947.393	-1956.695	-1950.561	-1939.60	-1930.480	-1943.112	-1933.684
Likelihood ratio	579.017	591.120	577.646	589.914	606.692	624.944	604.811	623.668
Prob > LR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Robust standard errors in parentheses
+ significant at 10 percent; * significant at 5 percent; ** significant at 1 percent

Table 6: Marginal effect on the probability of being satisfied with the duration of water supply (Bangalore)*

	(1)	(2)	(3)	(4)
Hours per day	0.008	0.013	-0.003	0.000
Relative HPD	0.064	0.055	0.177	0.174
Welfare status	0.157	0.094	0.160	0.096
Tenure status	-0.066	-0.059	-0.065	-0.058
Household Size	-0.115	-0.081	-0.121	-0.085
Education	0.026	0.009	0.025	0.007
Age	0.060	0.025	0.060	0.025
Sex	0.104	0.106	0.097	0.100
Fixed Effects	No	Yes	No	Yes
Reference Group	Geographic	Geographic	Socio-economic	Socio-economic

Table 7: Marginal effect on the probability of being satisfied with the duration of water supply (Jaipur)*

	(1)	(2)	(3)	(4)
Hours per day	0.038	0.037	0.016	0.012
Relative HPD	-0.031	-0.027	0.151	0.167
Welfare status	0.176	0.167	0.150	0.138
Tenure status	-0.066	-0.067	-0.065	-0.065
Household Size	-0.105	-0.103	-0.093	-0.092
Education	-0.019	-0.018	-0.018	-0.017
Age	-0.077	-0.084	-0.076	-0.083
Sex	-0.053	-0.047	-0.055	-0.045
Fixed Effects	No	Yes	No	Yes
Reference Group	Geographic	Geographic	Socio-economic	Socio-economic

* Using individual level characteristics of the household head.

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